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;******************************************************
;                                                    *
;        PROGRAM ID:     BIOS LOADER TRANSIENT        *
;                                                    *
;******************************************************
;                                                    *
;        PROPERTY OF:    JADE COMPUTER PRODUCTS        *
;                        4901 W. ROSECRANS BLVD.       *
;                        HAWTHORNE, CALIFORNIA         *
;                        90250,   U.S.A.               *
;                                                    *
;******************************************************
;                                                    *
;        VERSION:        2.2                          *
;                                                    *
;******************************************************
; THE BIOS LOADER IS READ INTO THE DCM SECTOR BUFFER *
; AFTER THE DCM PROGRAM HAS INITIALIZE. THIS PROGRAM  *
; THEN READS THE  BIOS MODULE (1K) INTO BANK 1.   THE *
; COMMAND BLOCK IN  DCM IS SET TO INDICATE THE  BIOS  *
; MODULE SIZE AND ITS LOAD ADDRESS.   THE BIOS LOADER *
; PROGRAM IS  GENERATED BY MOVCPM.COM  AS THE   COLD  *
; START LOADER (900-97F HEX).                         *
;******************************************* SK  ***
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                    ;********************************************************
                    ; CONTROLLER PORT ASSIGNMENTS                          *
                    ;********************************************************

0000                BL.STS  ==      000H    ;BOARD STATUS
0000                BL.CTL  ==      000H    ;BOARD CONTROLS
0004                WD.CMD  ==      004H    ;1791 COMMAND REGISTER
0004                WD.STS  ==      004H    ;1791 STATUS REGISTER
0006                WD.SEC  ==      006H    ;1791 SECTOR REGISTOR
0007                WD.DTA  ==      007H    ;1791 DATA REGISTER
0010                XP.MTO  ==      010H    ;MOTOR TIME OUT
0040                XP.MTX  ==      040H    ;MOTOR TIME EXTEND
0080                XP.DSH  ==      080H    ;DATA SYNC HOLD


                    ;********************************************************
                    ; 1791-01 COMMAND AND MASK.                            *
                    ;********************************************************

0080                DC.RDS  ==  10000000B   ;READ SECTOR.
009C                DM.RER  ==  10011100B   ;READ ERROR MASK.


                    ;********************************************************
                    ; SYSTEM ASSIGNMENTS                                   *
                    ;********************************************************

0014                NMBR.K  ==      20      ;SYSTEM SIZE IN K.
0400                LNG.1K  ==      1024    ;TOTAL BYTES IN 1K.
5000                CPM.SZ  ==      NMBR.K*LNG.1K   ;TOTAL SYSTEM BYTES.
0600                BIOS.S  ==      LNG.1K*3/2      ;BIOS ALLOCATED SIZE.
4A00                BIOS.A  ==      CPM.SZ-BIOS.S   ;BIOS LOAD ADDRESS.


                    ;********************************************************
                    ; INTERNAL MEMORY ASSIGNMENTS                          *
                    ;********************************************************

1000                BANK.0  ==      1000H           ;LOWER BANK ADDRESS.
0400                BANK.L  ==      0400H           ;1K BANK LENGTH.
1400                BANK.1  ==      BANK.0+BANK.L    ;UPPER BANK ADDRESS.
1370                IO.BLK  ==      BANK.0+0370H     ;I/O BLOCK ADDRESS.
1377                CB.STS  ==      IO.BLK+0007H     ;COMMAND STATUS BYTE.
1378                CW.LAD  ==      IO.BLK+0008H     ;BIOS LOAD ADDR LOC.
137A                CW.LNG  ==      IO.BLK+000AH     ;BIOS LOAD LENGTH LOC.
1380                SEC.BF  ==      BANK.0+0380H     ;SECTOR BUFFER AREA.


                    ;********************************************************
                    ; BIOS PROGRAM LINKAGE.                                *
                    ;********************************************************

0004                SEC.BG  ==      4       ;FIRST BIOS SECTOR.
0008                SEC.NM  ==      8       ;NUMBER OF SECTORS.
000B                SEC.EX  ==      SEC.BG+SEC.NM-1 ;LAST BIOS SECTOR.


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                        ; **********************************************************
                        ; ASSEMBLER DIRECTIVES                                     *
                        ; **********************************************************

                                .PABS
                                .PHEX
                                .XLINK
1380                            .LOC    SEC.BF          ;PROGRAM START POINT


                        ; **********************************************************
                        ; PAUSE MACRO.  ALLOWS 1791 TO DIGEST INSTRUCTIONS!   *
                        ; **********************************************************

                        .DEFINE PAUSE = [
                                XTHL
                                XTHL
                                XTHL
                                XTHL]


                        ; **********************************************************
                        ; INITIALIZE BIOS READ OPERATION                           *
                        ; **********************************************************

1380    21 0400     BEGIN:  LXI     H,LNG.1K        ;BIOS LOAD LENGTH.
1383    22 137A             SHLD    CW.LNG          ;LOAD LENGTH SET.
1386    21 4A00             LXI     H,BIOS.A        ;BIOS SYSTEM ADDR.
1389    22 1378             SHLD    CW.LAD          ;LOAD ADDRESS SET.
138C    21 1400             LXI     H,BANK.1        ;BIOS LOAD POINT.


                        ; **********************************************************
                        ; SET-UP FOR EACH READ SECTOR COMMAND                      *
                        ; **********************************************************

138F    FD21 13AB   RD.SEC: LXI     Y,RD.TST        ;SET NMI VECTOR.
1393    3A 13C7            LDA     SECTOR          ;FIRST BIOS SECTOR.
1396    A9                XRA     C               ;INVERT (1791-01).
1397    D306              OUT     WD.SEC          ;SET 1791 SEC REG.
1399    3E80              MVI     A,DC.RDS        ;READ SECTOR CMND.
139B    A9                XRA     C               ;INVERT (1791-01).
139C    D304              OUT     WD.CMD          ;ISSUE 1791 COMMAND.
139E    E3                PAUSE                   ;ALLOW 1791 TO SETTLE.


                        ; **********************************************************
                        ; READ SECTOR OPERATION                                    *
                        ; **********************************************************

13A2    DB80        RD.BYT: IN      XP.DSH          ;WAIT FOR DATA.
13A4    DB07               IN      WD.DTA          ;INPUT INV DATA.
13A6    A9                 XRA     C               ;INVERT (1791-01).
13A7    77                 MOV     M,A             ;STORE DCM BYTE.
13A8    23                 INX     H               ;INCREMENT POINTER.
13A9    18F7               JMPR    RD.BYT          ;REPEAT OPERATION.


                        ; **********************************************************
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                    ; ***************************************************
                    ; CHECK READ SECTOR STATUS, REPEAT UNTIL BIOS LOADED *
                    ; ***************************************************

  13AB  E69C   RD.TST: ANI     DM.RER          ;TEST FOR ERRORS.
  13AD  200D           JRNZ    ERRORS          ;ERROR DETECTED.
  13AF  3A 13C7        LDA     SECTOR          ;GET SECTOR NMBR.
  13B2  FE0B           CPI     SEC.EX          ;CHECK IF LAST SEC.
  13B4  280F           JRZ     FINISH          ;GO IF FINISHED.
  13B6  3C             INR     A               ;INCREMENT.
  13B7  32 13C7        STA     SECTOR          ;STORE AWAY.
  13BA  18D3           JMPR    RD.SEC          ;READ NEXT SECTOR.


                    ; ***************************************************
                    ; READ ERROR HAS BEEN DETECTED                      *
                    ; ***************************************************

  13BC  32 1377   ERRORS: STA     CB.STS          ;DISPLAY ERROR STATUS.
  13BF  AF             XRA     A               ;ZERO  A REGISTER.
  13C0  D300           OUT     BL.CTL          ;DESELECT DRIVE.
  13C2  DB10           IN      XP.MTO          ;MOTOR OFF!
  13C4  76             HLT                     ;TERMINATE.


                    ; ***************************************************
                    ; BIOS SECTOR HAVE BEEN LOADED                      *
                    ; ***************************************************

  13C5  FB        FINISH: EI                      ;ENABLE INTERRUPTS.
  13C6  76             HLT                     ;SHUTDOWN BOARD.


                    ; ***************************************************
                    ; SECTOR NUMBER STORAGE                             *
                    ; ***************************************************

  13C7  04        SECTOR: .BYTE   SEC.BG          ;SECTOR COUNTER.


                    ; ***************************************************
                            .END
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BANK.0 1000	BANK.1 1400	BANK.L 0400	BEGIN 1380
BIOS.A 4A00	BIOS.S 0600	BL.CTL 0000	BL.STS 0000
CB.STS 1377	CPM.SZ 5000	CW.LAD 1378	CW.LNG 137A
DC.RDS 0080	DM.RER 009C	ERRORS 13BC	FINISH 13C5
IO.BLK 1370	LNG.1K 0400	NMBR.K 0014	RD.BYT 13A2
RD.SEC 138F	RD.TST 13AB	SECTOR 13C7	SEC.BF 1380
SEC.BG 0004	SEC.EX 000B	SEC.NM 0008	WD.CMD 0004
WD.DTA 0007	WD.SEC 0006	WD.STS 0004	XP.DSH 0080
XP.MTO 0010	XP.MTX 0040		